5.3 Reverse Percentages: 2-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Shop A has a sale with 10% off. Shop B has a sale with 25% off. The same camera costs £189.00 in Shop A's sale and £277.50 in Shop B's sale. Which shop had the higher original price, and by how much?

(Total for Question 1 is 4 marks)

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2 A coat is sold with a discount of 30%. The coat now costs £138.11. Work out the original price of the coat.

(Total for Question 2 is 3 marks)

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3 The population of a town increased by 25% in ten years. It is now 362500. Work out the population ten years ago.

(Total for Question 3 is 2 marks)

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4 In a sale, all prices are reduced by 40%. A television costs £157.20 in the sale. Work out how much was taken off the original price.

(Total for Question 4 is 3 marks)

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5 Priya's monthly salary was increased by 4%. Her new monthly salary is £2,496. Work out Priya's monthly salary before the increase.

(Total for Question 5 is 2 marks)

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6 A car service costs £96, including VAT at 20%. Work out the cost of the service before VAT was added.

(Total for Question 6 is 3 marks)

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7 The price of a train ticket increased by 10%. The new price is £71.50. Work out the original price of the ticket.

(Total for Question 7 is 2 marks)

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8 A price is reduced by 25% in a sale to £54. Work out the original price.

(Total for Question 8 is 2 marks)

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9 A laptop originally costs £450. It is reduced by 20% and later increased by 10% on the reduced price. Work out the final selling price.

(Total for Question 9 is 3 marks)

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10 A bakery sells a loaf at £1.50 after applying a 20% profit on cost. Work out the cost price of the loaf.

(a) Find the cost price of one loaf. **(3)**

.....

(b) If the bakery makes 240 loaves a week, find the weekly profit in pounds. **(1)**

.....

(Total for Question 10 is 4 marks)

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11 A trader buys a bicycle and later sells it, making a loss of 20% on the price she paid. She sells the bicycle for £276.
Work out how much the trader paid for the bicycle.

(Total for Question 11 is 2 marks)

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12 For each part, work out the original number before the stated percentage change was made.

(a) A number is increased by 6% to give 4,770. Work out the original number. **(2)**

.....

(b) A number is decreased by 35% to give 260. Work out the original number. **(2)**

.....

(c) A number is increased by 2.5% to give 861. Work out the original number. **(2)**

.....

(Total for Question 12 is 6 marks)

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13 The price of a laptop after a 12% increase is £280. Work out the original price of the laptop.

(Total for Question 13 is 3 marks)

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14 After a pay rise of 3%, Kwame's monthly salary is £2,729.50. Work out his monthly salary before the rise.

(Total for Question 14 is 3 marks)

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15 A shop reduces the price of a jacket by 30% in a sale. The sale price is £42. Work out the original price of the jacket.

(Total for Question 15 is 3 marks)

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16 The number of pupils at a school increased by 6% this year to 477. Work out the number of pupils at the school last year.

(Total for Question 16 is 3 marks)

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17 A company's profit increased by 10% in 2024, and then increased by a further 5% in 2025. The profit in 2025 was £46,200. Work out the company's profit in 2023, before either increase.

(Total for Question 17 is 4 marks)

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18 A retailer buys bicycles from a wholesaler. The retailer adds a mark-up of 20% to the wholesale price to get the normal shop price. In a sale, the shop price is then reduced by 15%.
The final sale price of a bicycle is £142.80.
Work out the price the retailer paid the wholesaler for the bicycle.

(Total for Question 18 is 3 marks)

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19 The price of a train ticket increases by 4% every year.
This year, after the increase, the ticket costs £108.16. This price already includes an increase of 4% that was applied last year, and a separate increase of 4% that was applied the year before that.
Work out the price of the train ticket two years ago, before either of these two increases.

(Total for Question 19 is 3 marks)

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20 A tumble dryer is on sale with a 20% discount already applied to its original price. VAT at 20% is then added to the discounted price, giving a final price of £372. A shop advert claims the tumble dryer was originally priced at £450 before any discount.

(a) Work out the original price of the tumble dryer, before the discount was applied. **(3)**

.....

(b) State, with a reason, whether the shop's advert is correct. **(2)**

(Total for Question 20 is 5 marks)

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21 A shop increases the price of a coffee machine by 30%, then reduces this new price by 30% in a clearance sale. The final sale price is £109.20. Work out the original price of the coffee machine, and state whether the final sale price is greater than, less than, or equal to the original price.

(Total for Question 21 is 4 marks)

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22 Two market stalls sell the same style of scarf. At Stall A, the original price was increased by 25% to a sale-day price of £30. At Stall B, the original price was decreased by 20% to a sale-day price of £30.

(a) Work out the original price of the scarf at Stall A. **(2)**

.....

(b) Work out the original price of the scarf at Stall B. **(2)**

.....

(c) State which stall's scarf had the greater original price, giving a reason. **(1)**

(Total for Question 22 is 5 marks)

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23 A retailer increases the shelf price of a product by 40% to allow for a trade discount of 20% to retailers and still achieve the desired selling price to the public. The desired public selling price is £84. Work out the original manufacturing cost before the 40% increase.

(a) Find the shelf price that results after the 40% increase, given the public selling price is £84 after the 20% trade discount is applied to the shelf price. **(3)**

.....

(b) Find the manufacturing cost before the 40% increase. **(3)**

.....

(Total for Question 23 is 6 marks)

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24 A company's revenue increased by 8% in Year 1, and then decreased by 5% in Year 2. The Year 2 revenue was £513,000. Work out the revenue before Year 1, and work out the overall percentage change in revenue from before Year 1 to the end of Year 2.

(Total for Question 24 is 6 marks)

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25 A charity sells tickets for a concert. They set the ticket price so that after paying an 18% commission to the box office and giving 12% of the remaining amount to the performers, the charity receives £5000. Work out the ticket price before commissions and payments if this amount relates to the total ticket revenue.

(a) Let total ticket revenue be R. Express the amount the charity receives in terms of R and show the equation to find R. **(2)**

(b) Solve your equation to find the total ticket revenue R, giving your answer to 2 decimal places and include appropriate units. **(4)**

(Total for Question 25 is 6 marks)

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Mark scheme · 5.3 Reverse Percentages: 2-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

90% or 0.9 used as multiplier	**M1**
£277.50 / 0.75 oe for Shop B	**M1**
original prices £210 and £370	**A1**
Shop B by £160 cao	**A1**

Answer: Shop B by £160

Question 2

70% or 0.7 identified as the multiplier	**M1**
£138.11 / 0.7 oe	**M1**
£197.30 cao	**A1**

Answer: £197.30

Question 3

125% or 1.25 used as multiplier	**M1**
290000 cao	**A1**

Answer: 290000

Question 4

0.6 identified as multiplier	**M1**
£262.00 cao (original price)	**A1**
£104.80 cao	**A1**

Answer: £104.80

Question 5

2496 / 1.04 oe	**M1**
£2400 cao	**A1**

Answer: £2,400

Question 6

correct multiplier 1.20 oe	**M1**
complete method 96 / 1.2	**M1**
£80 cao	**A1**

Answer: £80

Question 7

correct multiplier 1.10 oe, or 71.50 / 1.1 seen	**M1**
£65 cao	**A1**

Answer: £65

Question 8

correct multiplier 0.75 oe, or 54 / 0.75 seen	**M1**
£72 cao	**A1**

Answer: £72

Question 9

find reduced price: 450 * 0.80 = 360 or show 20% of 450 = 90 then 450 - 90	**M1**
increase reduced price by 10%: 360 * 1.10 or show 10% of 360 = 36 then add	**M1**
396 cao	**A1**

Answer: £396 cao

Question 10

(a) recognise selling price 1.50 = 120% of cost and divide by 1.20	**M1**
(a) 1.25 cao	**A1**
(a) units and currency correct	**B1**

(a) Answer: £1.25

(b) profit per loaf = 1.50 - 1.25 = 0.25, weekly profit = 240 * 0.25 = 60	**B1**

(b) Answer: £60

Question 11

276 / 0.80 oe	**M1**
£345 cao	**A1**

Answer: £345

Question 12

(a) 4770 / 1.06 oe	**M1**
(a) 4500 cao	**A1**

(a) Answer: 4500

(b) 260 / 0.65 oe	**M1**
(b) 400 cao	**A1**

(b) Answer: 400

(c) 861 / 1.025 oe	**M1**
(c) 840 cao	**A1**

(c) Answer: 840

Question 13

correct multiplier 1.12 oe	**M1**
complete method 280 / 1.12	**M1**
£250 cao	**A1**

Answer: £250

Question 14

correct multiplier 1.03 oe	**M1**
complete method 2729.50 / 1.03	**M1**
£2,650 cao	**A1**

Answer: £2,650

Question 15

correct multiplier 0.70 oe	**M1**
complete method 42 / 0.70	**M1**
£60 cao	**A1**

Answer: £60

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Question 16

correct multiplier 1.06 oe	**M1**
complete method 477 / 1.06	**M1**
450 pupils cao	**A1**

Answer: 450 pupils

Question 17

46200 / 1.05 (or an equivalent first step to undo the 2025 increase)	**M1**
£44,000 (interim 2024 profit)	**A1**
44000 / 1.1 (or an equivalent step to undo the 2024 increase)	**M1**
£40,000 cao	**A1**

Answer: £40,000

Question 18

overall multiplier 1.20 x 0.85 (= 1.02) found oe	**M1**
142.80 / 1.02 used, dependent on a correct method for the overall multiplier	**M1**
£140 cao	**A1**

Answer: £140

Question 19

108.16 / 1.04 (= 104) oe	**M1**
104 / 1.04 used, dependent on the first M1	**M1**
£100 cao	**A1**

Answer: £100

Question 20

(a) combined multiplier 0.8 x 1.2 = 0.96 oe, or an equivalent stepwise method (e.g. 372 / 1.2 = 310 seen)	**M1**
(a) complete method to find the original price, e.g. 372 / 0.96, or 310 / 0.8	**M1**
(a) £387.50 cao	**A1**

(a) Answer: £387.50

(b) ft correct decision that the advert is not correct, referencing the £387.50 found in part (a)	**B1**
(b) correct supporting figure, e.g. states the original price was £62.50 less than the advertised £450 (450 - 387.50 = 62.50)	**B1**

(b) Answer: No; the original price was £387.50, which is £62.50 less than the advertised £450.

Question 21

combined multiplier 1.3 x 0.7 = 0.91 oe (or an equivalent stepwise method)	**M1**
complete method 109.20 / 0.91	**M1**
£120 cao	**A1**
ft states less than, since the combined multiplier 0.91 is less than 1	**B1**

Answer: £120; the final sale price is less than the original price.

Question 22

(a) correct multiplier 1.25 oe, or 30 / 1.25 seen	**M1**
(a) £24 cao	**A1**

(a) Answer: £24

(b) correct multiplier 0.8 oe, or 30 / 0.8 seen	**M1**
(b) £37.50 cao	**A1**

(b) Answer: £37.50

(c) ft Stall B, since £37.50 is greater than £24	**B1**

(c) Answer: Stall B, since £37.50 > £24.

Question 23

(a) let shelf price = S, then public price 84 = S*(1-0.20)=0.80S or reverse: S = 84/0.80	**M1**
(a) calculate S = 105 (or equivalent)	**M1**
(a) £105 cao	**A1**

(a) Answer: £105

(b) use shelf price 105 = cost * 1.40 so cost = 105/1.40	**M1**
(b) calculate cost = 75	**M1**
(b) £75 cao	**A1**

(b) Answer: £75

Question 24

combined multiplier 1.08 x 0.95 = 1.026 oe (or an equivalent stepwise method)	**M1**
complete method 513000 / 1.026	**M1**
£500,000 cao	**A1**
identifies that the overall multiplier 1.026 corresponds to a percentage change	**M1**
2.6% cao	**A1**
ft states an increase (not a decrease), since 1.026 is greater than 1	**B1**

Answer: £500,000; an overall increase of 2.6%.

Question 25

(a) subtract 18% commission: remaining = 0.82R, then give 12% of remaining to performers so charity keeps 0.88 of 0.82R = 0.82*0.88R	**M1**
(a) equation 0.82*0.88 R = 5000 or 0.7216R = 5000	**A1**

(a) Answer: Equation: 0.82 * 0.88 * R = 5000 or 0.7216R = 5000

(b) rearrange 0.7216R = 5000 to R = 5000/0.7216	**M1**
(b) calculate the division 5000 / 0.7216	**M1**
(b) 6929.05 cao, to 2 dp	**A1**
(b) include units: pounds	**B1**

(b) Answer: £6929.05

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